DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to heat exchangers, such as an evaporator.
[0002]
[Description of the Prior Art]Conventionally, as a heat exchanger, what was indicated by JP,H06-74865,U is known, for example.
[0003]Generally this kind of heat exchanger laminates the flat tube 1 and the corrugated fin 2 by turns, as shown in drawing 4, It has structure which connected the top and bottom ends of each of this flat tube 1 to the header 3, and carried out low attachment of the flat tube 1, the corrugated fin 2, and the flat tube 1 and the header 3 mutually.
[0004]As shown in drawing 5, while making a turbulent flow occur to the air to pass and raising the corrugated fin 2 heat exchanging efficiency to it, in order to make it flow down caudad so that the water of condensation 5 may not disperse in the downstream of a heat exchanger in accordance with the flow of air, two or more louvers 4 are formed.
[0005]
[Problem(s) to be Solved by the Invention]In the above-mentioned heat exchanger, all the adjacent fin sides are formed in parallel. In such a heat exchanger, when the passage wind which passes a fin increases rapidly, dew condensation water collects on the fin of a leeward end easily, and it may become a phenomenon which covers with the lid of the fin sides which this dew condensation water adjoins. Dew condensation water disperses easily in the heat exchanger exterior from a leeward end.
[0006]On the other hand, as shown in drawing 6, the heat exchanger formed with the angle of gradient with all the adjacent constant fin sides is also known. In such a heat exchanger, since it is easy to retain dew condensation water inside a fin mountain, the circulation area of air became narrow and degradation and the increase in ventilation resistance have been caused.

[0007]This invention provides the heat exchanger which has the fin structure which dew condensation water does not collect on the fin of a leeward end easily, and cannot retain dew condensation water easily inside a fin mountain.

[0008]

[Means for Solving the Problem]An invention of Claim 1 is the heat exchanger which installed a flat tube and a corrugated fin side by side horizontally by turns, and formed them, and this each corrugated fin, It is the composition which consists of a parallel fin part by which adjoining fin sides were formed in parallel in a part of sliding direction, and an inclination fin part in which the fin sides by which other portions of a sliding direction are adjoined were formed by inclining. In this composition, since it is easy to move dew condensation water to other portions from a part of sliding direction, wastewater nature becomes good and a phenomenon in which it is covered with the lid of the fin sides with dew condensation water is also improved dramatically. As compared with that toward which all the fins inclined, the low attachment nature of a fin and a flat tube also becomes good.

[0009]An invention of Claim 2 is the heat exchanger which installed a flat tube and a corrugated fin side by side horizontally by turns, and formed them, and this each corrugated fin, It is the composition which consists of the 1st inclination fin part by which an angle of gradient of adjoining fin sides was greatly formed in a part of sliding direction, and the 2nd inclination fin part in which an angle of gradient of the fin sides which adjoin other portions of a sliding direction was formed small. In this composition, since it is easy to move dew condensation water to other portions from a part of sliding direction, wastewater nature becomes good and a phenomenon in which it is covered with the lid of the fin sides with dew condensation water is also improved dramatically. Since an angle of gradient of some fins is only changed, it inclines and all the fins are formed, it can manufacture without changing a roller for shaping of a fin, and it can manufacture, without increasing a manufacturing process and a manufacturing cost.

[0010]As for an invention of Claim 3, in the heat exchanger according to claim 1 or 2, since the above of a sliding direction of each above-mentioned corrugated fin part is formed upward from a center and dew condensation water is drained actively caudad, wastewater nature in a fin becomes very good. Since there is little quantity of dew condensation water even if ventilation quantity increases rapidly and dew condensation water gathers for the downstream, since the water retention of the fin upper part is lowered, a phenomenon in which it is covered with the lid of the fin sides with dew condensation water can be abolished by leaps and bounds.

[0011]In the heat exchanger according to claim 3, since the above of a sliding direction of each above-mentioned corrugated fin part is three or more mountains and is formed by 5 to 15% of sliding direction length, dew condensation water is drained actively caudad, wastewater nature

in a fin becomes very good, and an invention of Claim 4 also has few draft resistances.

[0012]

[Embodiment of the Invention]Below, the 1st working example of this invention is described based on Drawings. As the lamination type heat exchanger 10 of this working example is shown in drawing 1, two or more flat tubes 11 and the corrugated fin 12 for heat dissipation are laminated in parallel with a transverse direction. The header 13 is formed under the laminated flat tube 11 and the corrugated fin 12, and each open end of the flat tube 11 is soldered by the header 13. The louver 14 which cut to the longitudinal direction and was formed by **** is formed in the corrugated fin 12.

[0013]As shown in drawing 2, as for corrugated fin 12 each, the top fin part 15a whose angle of gradient of the upper part is large, and its lower part consist of the lower fin part 16a with a small angle of gradient. Since it is hard to retain water in the top fin part 15a with a large angle of gradient, the water of condensation is in the tendency to flow into the lower part without stopping at the top fin part 15a. Therefore, since there is not much water of condensation even if air capacity increases rapidly and the water of condensation of a windward fin part is carried into a lee fin part, it is necessary to hardly generate the state where the effective area product of a fin part is covered with the water of condensation, and it covers.

[0014]Length l of the fin portion 15a with a large angle of gradient is 5 to 15% to length L of the whole fin. If less than 5%, the flow of the water of condensation from the fin upper part to the fin lower part is not enough, and since fin sides are covered with the water of condensation in many cases, it is not desirable. If it becomes not less than 15%, the absolute magnitude of a fin runs short, heat exchanging capacity is insufficient, and it is not desirable. In order to satisfy the above-mentioned function, the fin mountain of the fin part 15a with a large angle of gradient needs at least three or more mountains.

[0015]This corrugated fin 12 bends a fin with a louver to San-ya with the same angle of gradient, forms it in corrugated shape, extends the portion equivalent to the top fin part 15a, and should just enlarge an angle of gradient. Since special molding equipment or forming cycle are not needed in order to form the fin from which an angle of gradient differs in this art, manufacture is easy.

[0016]With respect to the 2nd working example, drawing 3 forms the top fin part 15b of a corrugated fin in a state with a mutual parallel fin side, and forms the lower fin part 16b in a fin configuration with an angle of gradient. In this 2nd working example, since there is no portion to which the interval of adjoining fins became narrow, it has the structure where the water of condensation cannot stagnate easily to the top fin part 15b. Therefore, the water of condensation comes to flow into the lower fin part 16b from the top fin part 15b. In the lower fin part 16b, since the motion which flows rather than stagnating becomes active in connection with this flow, it comes to be discharged also from here. A lid operation of the fin side by the

water of condensation can be prevented in this 2nd working example as well as the 1st working example. What is necessary is just for heat exchanging efficiency not to change but to carry out the partial change of the metallic mold which fabricates the portion in which manufacture is also equivalent to a top fin part as compared with what was only formed in the fin configuration of the same angle of gradient, and a manufacturing process and the production man hour can manufacture the corrugated fin of this example, without increasing.

[0017]Although each corrugated fin 12 of the 1st working example of the above and the 2nd working example used the top fin part of the corrugated fin of all the sequences as the fins 15a and 15b with a large angle of gradient, it is carried out in this way with no fins, and some its corrugated fins are good also as a fin of a simple angle of gradient. There is no necessity of making these fin parts 15a and 15b into the same length with all fins, and when air capacity increases rapidly, it may be made to form many the large fin configurations or the parallel fin configurations of an angle of gradient about the fin in the portion more than which the water of condensation increases in number at leeward. For example, the center of a heat exchanger may be lengthened more and both ends may be shortened.

[0018]

[Effect of the Invention]Since it consists of a parallel fin part in which the fin sides which a part of sliding direction of a corrugated fin adjoins were formed in parallel in this invention, or an inclination fin part in which the adjoining angle of gradient of fin sides was formed greatly, The wastewater nature of dew condensation water is good, and heat exchanging efficiency can be improved, without plugging up the opening of fin sides with dew condensation water. In what is three or more mountains and is formed by 5 to 15% of sliding direction length, dew condensation water is drained actively caudad, the wastewater nature in a fin becomes very good, and a parallel fin part or the inclination fin part in which the angle of gradient was formed greatly can also reduce a draft resistance.

[Translation done.]